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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

NEW APPLICATION TRANSMITTAL

Transmitted herewith for filing is the patent application of

Inventor(s): Claton F. Clevenger

For (title): COMMUNICATION SYSTEM FOR DEDICATED AND SWITCHED COMMUNICATIONS

1. Type of Application

This transmittal is for an original (nonprovisional) application.

09691008 101800

CERTIFICATION UNDER 37 C.F.R. SECTIONS 1.8(a) AND 1.10*
*(When using Express Mail, the Express Mail label number is **mandatory**;*
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I hereby certify that, on the date shown below, this correspondence is being:

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[ ] deposited with the United States Postal Service in an envelope addressed to: Box Patent Application, Assistant Commissioner for Patents, Washington, D.C. 20231.
37 C.F.R. Section 1.8(a)

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37 C.F.R. Section 1.10*

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Cheryl Martinez
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*"Since the filing of correspondence under [Section] 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will **not** be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.*

2. Papers Enclosed

A. Required for filing date under 37 C.F.R. 1.53(b) (Regular) or 37 C.F.R. 1.153 (Design) Application

13 Page(s) of Specification
7 Page(s) of Claims
7 Sheet(s) of Drawing(s)--Formal

B. Other Papers Enclosed

2 Page(s) of declaration and power of attorney
1 Page(s) of abstract

3. Declaration or Oath

Enclosed

Executed by:
* inventor.

4. Inventorship Statement

The inventorship for all the claims in this application is the same.

5. Language

English

6. Assignment

An assignment of the invention to Sprint Communciations Company, L.P. is attached. A separate "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" is also attached.

Doc # 6074950

7. **Fee Calculation (37 C.F.R. Section 1.16)**

Regular Application

CLAIMS AS FILED

Claims	Number Filed	Basic Fee Allowance	Number Extra	Rate	Basic Fee 37 CFR 1.16(a) $710.00
Total Claims (37 CFR 1.16(c))	34	- 20 =	14 x	$18.00	$252.00
Independent Claims (37 CFR 1.16(b))	3	- 3 =	0 x	$80.00	$0.00
Multiple Dependent Claim(s), if any (37 CFR 1.16(d))			+	$270.00	$0.00

Filing Fee Calculation $962.00

8. **Fee Payment Being Made at This Time**

Enclosed

Filing Fee	$962.00
Recording assignment ($40; 37 C.F.R. Section 1.21(h)) (See attached "COVER SHEET FOR ASSIGNMENT ACCOMPANYING NEW APPLICATION".)	$40.00
Total Fees Enclosed	$1,002.00

9. Method of Payment of Fees

Charge Account No. 21-0765 in the amount of $1,002.00.
A duplicate of this transmittal is attached.

10. Authorization to Charge Additional Fees

The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Account No. 21-0765.

37 C.F.R. Section 1.16(a), (f) or (g) (filing fees)

37 C.F.R. Section 1.16(b), (c) or (d) (presentation of extra claims)

37 C.F.R. Section 1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)

37 C.F.R. Section 1.17(a)(1)-(5) (extension fees pursuant to SECTION 1.136(a))

37 C.F.R. Section 1.17 (application processing fees)

11. Instructions as to Overpayment

Credit Account No. 21-0765.

Respectfully submitted,

SIGNATURE OF PRACTITIONER

Travis C. Stephenson, Reg. No. 45,132
Phone: (303) 379-1131
Fax: (303) 379-1155

ATTORNEY CONTACT:

CORRESPONDENCE ADDRESS:

Customer No. 021396

Attn: Harley R. Ball
Sprint Law Department
8140 Ward Parkway
Mailstop: MOKCMP0506
Kansas City, Missouri 64114

SPECIFICATION

TO ALL WHOM IT MAY CONCERN:

Be it known that I, Claton F. Clevenger, with residence and citizenship listed below, have invented the inventions described in the following specification entitled:

COMMUNICATION SYSTEM FOR DEDICATED AND SWITCHED COMMUNICATIONS

Claton F. Clevenger	residence:	7301 College Blvd. Overland Park, KS 66210-1858
	citizenship:	United States

COMMUNICATION SYSTEM FOR DEDICATED AND SWITCHED COMMUNICATIONS

RELATED APPLICATIONS

Not applicable

FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not applicable

MICROFICHE APPENDIX

Not applicable

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

The invention relates to communication systems, and specifically, to a communication system for providing dedicated communications and switched communications over a packet network.

2. DESCRIPTION OF THE PRIOR ART

A dedicated communication link is a direct non-switched communication link exclusively dedicated for a customer's use between specified points. Dedicated communication links are typically high capacity multi-channel communication links that provide dedicated services from one or more customer-specified locations to one or more other customer-specified locations. One example of a dedicated communication link is a T-1 digital transmission line having 24 channels that operate at 1.54 megabits per second. Often however, customers desiring dedicated services do not require the full capacity of these multi-channel communication links. In this case, a digital cross connect provides a channel capacity within the multi-channel link for dedicated communications, while the remaining channel capacity is used to carry switched communications. Some examples of the dedicated communications include private line

communications between two customer sites, Internet Protocol ("IP") communications for an IP network and frame relay communications for a frame relay network. Some examples of the switched communications include switched voice, video, and data.

Digital cross connects allow dedicated communications and switched communications to be transmitted from the customer premises to a network edge over a single multi-channel communication link. FIG. 1 illustrates an example of a communication system that provides dedicated and switched communication services. On FIG. 1 the customer premise equipment ("CPE") 100 is connected to a digital cross connect 101 by a T-1 communication link 110. The T-1 communication link 110 carries bundled communications including dedicated and switched communications for the CPE 100. The digital cross connect system 101 is provisioned to cross-connect incoming digital signal one ("DS1") communications within a digital signal three ("DS3") communication link to outgoing DS1 communications. The digital cross connect system 101 receives the bundled communications from the CPE 100 as well as other communication links (not shown) in the DS3 format and converts the communications to a DS1 format. The digital cross connect 111 receives the DS1 communications from the digital cross connect 101 and converts the DS1 format to a digital signal zero ("DS0") format to groom the private line communications, groom the IP communications, groom the frame relay communications, and groom the switched communications. Grooming repackages DS0 communications into different outgoing DS1 communications. The private line communications are then provided to the CPE 105, while the IP communications are provided to the IP network 108, the frame relay communications are provided to the frame relay network 109, and the switched communications are provided to the interworking system 103. Simultaneously the CPE 100 provides a call setup signaling message to the call processor 106, possibly over the signaling link 112. The call processor 106 processes the call setup signaling message from the CPE 100 to generate a routing instruction for the interworking system 103. In response to the routing instruction, the interworking system 103 packetizes the switched communications and transmits the packetized communications over the packet network 104 to the called destination.

SUMMARY OF THE INVENTION

The present invention advances the art by providing a communication system that exchanges both dedicated and switched communications over a packet network. The communication system comprises a dedicated processing system, a call processing system, and an interworking system. The dedicated processing system is configured to generate and transfer a first call setup message for the call processing system. The call processing system is configured to receive and process the first call setup message to select a first identifier and generate and transfer a first instruction indicating the first identifier and a dedicated communication. The call processing system also receives and processes a second call setup message from a customer premise equipment to select a second identifier, and generates and transfers a second instruction indicating the second identifier and a switched communication. The interworking system is configured to receive the first instruction, the second instruction, and a bundled communication that includes the dedicated communication and the switched communication. In response to the first instruction, the interworking system separates the dedicated communication from the switched communication and converts the dedicated communication into first packets including the first identifier. In response to the second instruction, the interworking system converts the switched communication into second packets including the second identifier and transfers the first packets and the second packets over the packet network.

Upon termination of the switched communication, the call processing system receives a call release message from one of the customer premise equipment or the network and processes the call release message to generate a call release instruction for the interworking system to stop packetization of the switched communications. The dedicated communication path, on the other hand, is only torn down following a customer request for reconfiguration or cancellation of the dedicated communication service.

A first advantage of the present communication system is that all customer traffic including switched and dedicated communications are routed over the same network using the same network equipment, resulting in more reliable communication services. A second advantage of the present invention is that dedicated communication circuits are provisioned as trunk groups permitting the call processing system to allocate and reallocate bandwidth using the method for a dialed number call setup. Similarly, a third advantage of the present

communication system is that the bundled dedicated and switched communications no longer need to be groomed at the DSO level to separate individual communications. A fourth advantage of the present communication system is the seamless integration of customer reconfiguration of bandwidth for dedicated services.

In the context of the present invention the first, second, third, fourth, etc. connotations used to reference the messages, the calls, and the devices are used for the purpose of differentiating between different messages, different calls, and different devices and are not used to indicate a message sequence, call sequence or processing sequence.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates an example of a prior art communication system;

FIG. 2 illustrates an example of a network architecture for a communication system according to the present invention;

FIGS. 3-4 are a flowchart illustrating an example of the operational steps for a communication system according to the present invention;

FIG. 5 illustrates an example of a system configuration for a communication system according to the present invention; and

FIGS. 6-7 is a flow chart illustrating another example of the operational steps for a communication system according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Network Architecture FIG. 2:

FIG. 2 illustrates an example of a network architecture for a communication system 200 according to the present invention. FIG. 2 depicts the CPE 100, the communication system 200, the packet network 104, the CPE 105, the IP network 108 and the frame relay network 109. The communication system 200 comprises a dedicated processing system 201, a call processing system 202 and an interworking system 203.

The dedicated communication system 201 is connected to the CPE 100 by a communication link 206. The communication link 206 could be a conventional wireline or wireless communication link configured to carry control messages between the CPE 100 and the

dedicated communication system 201. In other examples of the invention, human operators using a graphical user interface (not shown), could send the control messages to the dedicated processing system 201. The call processing system 202 is connected to the CPE 100 by a communication link 205. The communication link 205 could be a conventional wireline or wireless communication link configured to carry control messages between the CPE 100 and the call processing system 202. The interworking system 203 is connected to the CPE 100 by a communication link 204 and to the packet network 104 by a communication link 207. The communication link 204 could be any wireline or wireless communication link configured to exchange call traffic, such as voice, data and/or video communications between the CPE 100 and the interworking system 203. Some examples of the communication 204 include without limitation, a T-1 link, a T-3 link, and an integrated service digital network ("ISDN") link. The communication link 207 could be a conventional packet communication link that exchanges packet communications between the interworking system 203 and the packet network 104. The packet network 104 is connected to the CPE 105, the IP network 108 and the frame relay network 109 by conventional communication links.

Those skilled in the art will appreciate that in some embodiments of the invention the dedicated communication processing system 201, the call processing system 202, and the interworking system 203 could be a part of the same processing circuitry. Similarly, the dedicated communication processing system 201, the call processing system 202 and the interworking system 203 could comprise one or more CPU's as a matter of design choice. Those skilled in the art will also understand that the communication system 200 could include other conventional components not shown on FIG. 2 for clarity, and that communication links 204-206 could be combined into a single communication link, such as an ISDN communication link, which includes inband signaling and call traffic exchange.

The dedicated communication processing system 201 could be any device or group of devices configured to generate and transfer a first call setup message to the call processing system 202 to setup a dedicated communication path through the packet network 104. The dedicated communication processing system 201 also generates and transfers a first call release message for the call processing system 202 to break down and/or reconfigure the dedicated communication path through the packet network 104. It should be noted that unlike a

conventional call setup, however, the dedicated communication path remains setup until a customer desires reconfiguration or cancels the dedicated service. Thus, the dedicated communication path is "nailed up," as it is sometimes referred to in the art, until the customer requests a reconfiguration or cancellation that triggers the first call release message to be generated for the call processing system 202.

The call processing system 202 could be any device or group of devices configured to receive and process the first call setup message from the dedicated communication system 201 to select a first identifier and generate and transfer a first instruction indicating the first identifier and a dedicated communication for the interworking system 203. The call processing system 202 also receives and process a second call setup message from the CPE 100 to select a second identifier and generates and transfers a second instruction indicating the second identifier and a switched communication for the interworking system 203.

The interworking system 203 could be any device or group of devices configured to receive the first instruction, the second instruction, and a bundled communication including the dedicated communication and the switched communication form the CPE 100. In response to the first instruction, the interworking system 203 separates the dedicated communication from the switched communication and converts the dedicated communication into first packets that include the first identifier. In response to the second instruction, the interworking system 203 converts the switched communication into second packets that include the second identifier and transfers the first packets and the second packets over the packet network 104.

The first identifier and the second identifier could be any identifier that identifies to the packet network 104 a destination for the dedicated communication and the switched communication. For example the first identifier could be an address or virtual connection for the CPE 105. The first identifier could also be the address or virtual connection for the IP network 104 or the frame relay network 109, depending on the dedicated service subscribed to by the customer at CPE 100. Similarly, the second identifier could be an address or virtual connection for a called party (not shown) for a switched voice conversation, data transmission, and/or video communication over the packet network 104.

The dedicated communication could be any non-switched communication over a bandwidth allocation exclusively dedicated for a customer's use. Some examples of the

dedicated communication include without limitation, voice, video and data over a private line, frame relay network, or an IP network. The switched communication could be any non-dedicated switched communication over a bandwidth allocation not exclusively dedicated for the customer's use. Some examples of the switched communication include without limitation voice, video and/or data communications.

System Operation FIGS. 3-4:

FIGS. 3 and 4 are a flow chart illustrating an example of the operation of the communication system 200. On FIG. 3 the operation begins at step 300. At step 301, a customer at CPE 100 places an order over the communication link 206 for a dedicated communication service with a carrier operating the communication system 200. At step 302, a first call setup message is generated by the dedicated communication processing system 201 in response to the customer order and is transmitted to the call processing system 202. Examples of the call setup message include without limitation, a signaling system 7 initial address message ("IAM"), an ISDN set up message, a GR 303 set up message, a B-ISDN signaling message, an asynchronous transfer mode ("ATM") message or an ATM voice over internet protocol ("VoIP") message.

At step 303, the call processing system 202 receives the call setup message from the dedicated processing system 201 and processes the call setup message to select a first identifier and generates a first instruction for the interworking system 203. The first instruction indicates to the interworking system 203 the first identifier and the dedicated communication.

At step 304, the call processing system 202 receives a second call setup message from the CPE 100. The call processing system 202 processes the second call setup message to select a second identifier and generates a second instruction for the interworking system 203. The second instruction indicates to the interworking system 203 the second identifier and a switched communication. At step 305, the interworking system 203 receives a bundled communication from the CPE 100 that includes the dedicated communication and the switched communication and separates the bundled communication into the switched communication and the dedicated communication. At step 306, the interworking system 203 in response to the first instruction packetizes the dedicated communication into first packets that include the first identifier. Also at step 306, the interworking system 203, in response to the second instruction packetizes the

switched communication into second packets that include the second identifier, and transfers the first and second packets over the packet network 104. At step 307, the switched communication is terminated and the call processing system 202 receives a call release message from one of the CPE 100 or the packet network 104. Also at step 307, the call processing system 202 processes the call release message to generate and transfer a call release instruction to the interworking system 203. At step 308, the interworking system 203 processes the call release instruction to stop packetization for the second identifier.

If no customer request for cancellation or reprovisioning of the dedicated communication service are received at step 309, processing continues at step 304 and steps 304-309 are repeated to handle both dedicated communications and switched communications. If a customer request for cancellation or reprovisioning of the dedicated communication service is received at step 309, processing continues at step 310. At step 310, the dedicated processing system 201 generates a call release message and transmits the call release message to the call processing system 202. The call processing system 202 processes the call release message to generate a call release instruction and transmits the call release instruction to the interworking system 203. At step 311, the interworking system 203 processes the call release instruction to stop packetization for the first identifier. If the customer request is for a cancellation the processing ends at step 312. If the customer request is for a reprovisioning of the bandwidth allocation at step 309, then processing continues at step 302 and another call setup message is generated by the dedicated processing system 201 to setup the new bandwidth allocation. Thus advantageously, the dedicated communication path is nailed up for the dedicated communication service until the customer requests a reprovisioning or cancellation of the dedicated communication service.

System Configuration FIG. 5:

FIG. 5 illustrates another example of the communication system 200 of the present invention. Those skilled in the art will appreciate numerous variations that do not depart from the present invention. Those skilled in the art will also appreciate that various features described below could be combined with the above described embodiment to form multiple variations of the invention.

FIG. 5 depicts the communication system 200, the CPE 100 and a carrier 510. The communication system 200 comprises the dedicated processing system 201, the call processing system 202 and the interworking system 203. The dedicated processing system 201 comprises a graphical user interface ("GUI") 503, a processor 501 and a call processor ("CP") interface 502. The call processing system 202 comprises a signaling interface 505, a call processor 506 and an interworking system interface ("IUW") 507. The interworking system 203 comprises a digital cross connect 508 and a converter 509.

The dedicated processing system 201 could be any processing system that receives user instructions for the setup, breakdown and/or reconfiguration of dedicated communication paths. The user instructions could be received from the carrier 510 or from the customer at CPE 100. The user instructions are received in the dedicated processing system 201 by the GUI 503 and provided by the GUI 503 to the processor 501. The GUI 503 could be any GUI that permits customers to control, rearrange and switch dedicated communication bandwidth allocations and services using a computer terminal to transmit instructions to the GUI 503. The GUI 503 could also receive user instructions from the carrier 510. For example, the customer at CPE 100 could call the carrier 510 and have an attendant at the carrier 510 rearrange or switch a dedicated communication service or bandwidth allocation using the GUI 503.

The dedicated processing system 201 processes the instructions using the processor 501 to nail up the dedicated communication paths through the interworking system 203 similar to the call setup for a dialed number. For example, during installation the communication path 204 could be provisioned as a trunk group between the CPE 100 and the interworking system 203. The dedicated processing system 201 could use the trunk group designations in the call setup message to establish a bandwidth allocation for a dedicated communication path through the interworking system 203 using the call processing system 202. Similarly, upon a request for service cancellation or a reprovisioning of the bandwidth allocation, the dedicated processing system 201 could use a call release message and another call setup message to stop packetization for the dedicated communication path and/or reallocate bandwidth for a new dedicated communication path or service.

In operation, the processor 501 receives the user instructions from the GUI 503 and processes the user instructions to generate and transmit the call setup messages and call release

messages to setup and reconfigure dedicated communication paths. The processor 501 uses the CP interface 502 to provide the call setup and call release messages to the call processing system 202.

The call processing system 202 receives the call setup and call release messages from the dedicated processing system 201 using the signaling interface 505. The call processing system 202 processes the call setup and call release messages in the call processor 506 to generate control messages for the interworking system 203. The call processing system 202 also receives call setup messages for switched communications from the CPE 100 and/or the packet network 104 depending on the call direction. The call processing system 202 processes the call setup messages using the call processor 506 to generate control messages for the interworking system 203. The call processing system 202 could also receive call release messages from the packet network 104 and/or the CPE 100. The call processing system 202 processes the call release messages using the call processor 506 to generate control messages for the interworking system 203. The call processing system 202 uses the signaling interface 505 to exchange messages with the dedicated processing system 201 and the packet network 104. The call processing system 202 uses the IWU interface 507 to exchange the control messages with the interworking system 203.

The interworking system 203 could be a controllable asynchronous transfer mode ("ATM") matrix that exchanges ATM formatted user communications or call signaling. The interworking system 203 has access to virtual path/virtual channels (VP/VCs) over which it connects calls. For example a call can come in from the CPE 100 and be connected through the interworking system 203 in response to the control messages from the call processing system 202. Alternatively, a call can be connected in the opposite direction. The interworking system 203 uses the cross connect 508 to provide cross connect functionality in response to the control messages from the call processing system 202. Some examples of the cross connect functionality include without limitation, receiving communications in the DS3 format and demultiplexing to the DS1 format and the DS0 format. In some examples of the invention, the cross connect 508 could receive user communications in the ISDN format or the GR-303 format and convert the user communications to the DS0 format. In addition the cross connect could also transmit user communications in like manner to the CPE 105.

The converter 509 is operational to receive the user communications from the cross connect 508, convert the communications into packets and transmit the communications to the packet network 104. The converter 509 also receives packet communications from the packet network 104 and converts the packets into the user communication format and transmits the communications to the CPE 100. One example of the converter 509 is an ATM adaptation layer (AAL) that comprises both a convergence sublayer and a segmentation and reassembly sublayer and is configured to convert between the digital signal level format and the ATM format. AALs are known in the art, and information about AALs is provided by International Telecommunications Union (ITU) documents in the series of I.363, which are incorporated herein by reference.

System Operation FIGS. 6-7:

FIG. 6 is a flow chart illustrating another example of the operation of the communication system 200. On FIG. 6 the operation begins at step 600. At step 601, a user instruction is received in the GUI 503. The user instruction includes a request for an allocation of bandwidth for a dedicated communication service and could be received from the customer at the CPE 105 or from the carrier 510. At step 602, the processor 501 processes the user instruction to generate an IAM message for the call processing system 202 and transmits the IAM to the call processor 506 using the CP interface 502 and the signaling interface 505. The IAM message includes a trunk group designation corresponding to the requested bandwidth allocation to implement the private line over particular VP/VC circuits. The IAM message also includes the type and destination of the dedicated communication for the call processor 506. For example, a private line, frame relay, or IP dedicated communication and the corresponding address or virtual connection for the CPE 105, IP network 108 and/or frame relay network 109. At step 603, the call processor 506 receives the IAM message from the processor 501, and processes the IAM message to generate a control message for the converter 509. The control message includes the connection assignments to implement the VP/VC circuits. At step 604, the converter 509 receives the control messages from the call processor 506, identifies the virtual connection assignments in the control messages, and implements the assignments to provide dedicated communications between CPE 105 and the destination virtual connection or address. At step

605, bundled switched and dedicated communications are received from the CPE 105 in the cross connect 508. The cross connect 508 provides the appropriate conversions to the bundled communication and provides the bundled communications to the converter 509. Substantially simultaneously, IAM messages for the switched communications are received in the signaling interface 505 and are processed in the call processor 506 to generate control messages for the converter 509 at step 606. At step 607, the converter 509 receives the communications and packetizes the switched communications and transmits the switched packets to their destination address according to the control message for the switched communications from the call processor 506. The converter 509 also receives the dedicated communications and transmits the dedicated communications to their destination address according to the control messages from the call processor 506. At step 608, a call release message for a switched communication is received in the signaling interface 505 from one of the packet network 104 and the CPE 105. The call release message is processed in the call processor 506 to stop packetization of the switched communications and processing ends at step 609. It should be noted that the dedicated communication path remains nailed up until another user instruction is received in GUI 503 requesting a reconfiguration or cancellation of the dedicated service. Only at this time is a call release message generated and provided by the dedicated processing system 201 to tear down the dedicated communication path.

The above-described processing systems could be comprised of instructions that are stored on storage media. The instructions can be retrieved and executed by a processor. Some examples of instructions are software, program code, and firmware. Some examples of storage media are memory devices, tape, disks, integrated circuits, and servers. The instructions are operational when executed by the processor to direct the processor to operate in accord with the invention. The term "processor" refers to a single processing device or a group of inter-operational processing devices. Some examples of processors are integrated circuits and logic circuitry. Those skilled in the art are familiar with instructions, processors, and storage media.

Those skilled in the art will appreciate variations of the above described embodiments that fall within the scope of the invention. As a result, the invention is not limited to the specific examples and illustrations discussed above, but only by the following claims and their equivalents.

CLAIMS:

We claim:

1. A communication system comprising:

a dedicated processing system configured to generate and transfer a first call setup message;

a call processing system configured to receive and process the first call setup message to select a first identifier, generate and transfer a first instruction indicating the first identifier and a dedicated communication, receive and process a second call setup message to select a second identifier, and generate and transfer a second instruction indicating the second identifier and a switched communication; and

an interworking system configured to receive the first instruction, the second instruction, and a bundled communication including the dedicated communication and the switched communication, separate the dedicated communication from the switched communication, convert the dedicated communication into first packets including the first identifier in response to the first instruction, convert the switched communication into second packets including the second identifier in response to the second instruction, and transfer the first packets and the second packets.

2. The communication system of claim 1 wherein:

the dedicated processing system is configured to generate and transfer a first call release message;

the call processing system is configured to receive and process the first call release message to generate and transfer a third instruction indicating the first identifier for release, and receive and process a second release message to generate and transfer a fourth instruction indicating the second identifier for release; and

the interworking system is configured to receive the third instruction and the fourth instruction, stop the transfer of the first packets in response to the third message, and stop the transfer of the fourth packets in response to the fourth instruction.

3. The communication system of claim 1 wherein a first time difference between the first call setup message and the first call release message is greater than twenty four hours and a second time difference between the second call setup message and the second call release message is less than three hours.

4. The communication system of claim 1 wherein the dedicated processing system comprises a graphical user interface and the first call setup message is generated and transferred in response to a first user command from the graphical user interface and the second call release message is generated and transferred in response to a second user command from the graphical user interface.

5. The communication system of claim 4 wherein the first user command and the second user command are received in the graphical user interface from a remote location.

6. The communication system of claim 1 wherein the first call setup message is an initial address message and the second call setup message is an initial address message.

7. The communication system of claim 1 wherein the dedicated communication is a data communication.

8. The communication system of claim 1 wherein the dedicated communication is a private line communication.

9. The communication system of claim 1 wherein the dedicated communication is an internet protocol communication.

10. The communication system of claim 1 wherein the dedicated communication is a frame relay communication.

11. The communication system of claim 1 wherein the switched communication is a voice communication.

12. A method of operating a communication system, the method comprising:

generating and transferring a first call setup message in a dedicated processing system;

receiving the first call setup message in a call processing system and processing the first call setup message to select a first identifier, generate a first instruction indicating the first identifier and a dedicated communication and transfer the first instruction;

receiving a second call setup message in the call processing system and processing the second call setup message to select a second identifier, generate a second instruction indicating the second identifier and a switched communication and transfer the second instruction;

receiving the first instruction, the second instruction, and a bundled communication including the dedicated communication and the switched communication in an interworking system; and

separating the dedicated communication from the switched communication;

converting the dedicated communication into first packets including the first identifier in response to the first instruction;

converting the switched communication into second packets including the second identifier in response to the second instruction; and

transferring the first packets and the second packets.

13. The method of claim 12 the method further comprising:

generating and transferring a first call release message in the dedicated call processing system;

receiving the first call release message in the call processing system and processing the first call release message to generate and transfer a third instruction indicating the first identifier for release; and

receiving the third instruction in the interworking system and processing the third instruction to stop the transfer of the first packets.

14. The method of claim 13 the method further comprising:

receiving a second call release message in the call processing system and processing the second call release message to generate and transfer a fourth instruction indicating the second identifier for release; and

receiving the fourth instruction in the interworking system and processing the fourth instruction to stop the transfer of the second packets.

15. The method of claim 14 wherein a first time difference between the first call setup message and the first call release message is greater than twenty four hours and a second first time difference between the second call setup message and the second call release message is less than three hours.

16. The method of claim 13 the method further comprising:

generating and transferring the first call setup message in response to a first user command from a graphical user interface and generating and transferring the second call setup message in response to a second user command from the graphical user interface.

17. The method of claim 16 the method further comprising:

transmitting the first user command and the second user command to the graphical user interface from a remote location.

18. The method of claim 13 wherein the first call setup message is an initial address message.

19. The method of claim 13 wherein the dedicated communication is a data communication.

20. The method of claim 13 wherein the dedicated communication is a private line communication.

21. The method of claim 13 wherein the dedicated communication is an internet protocol communication.

22. The method of claim 13 wherein the dedicated communication is a frame relay communication.

23. The method of claim 13 wherein the switched communication is a voice communication.

24. A software product comprising:

dedicated processing system software operational when executed by a processor to direct the dedicated communication system to generate and transfer a first call setup message;

call processing system software operational when executed by the processor to direct the processing system to receive and process the first call setup message to select a first identifier, generate and transfer a first instruction indicating the first identifier and a dedicated communication, receive and process a second call setup message to select a second identifier, and generate and transfer a second instruction indicating the second identifier and a switched communication; and

interworking system software operational when executed by the processor to direct the interworking system to receive the first instruction, the second instruction, and a bundled communication including the dedicated communication and the switched communication, separate the dedicated communication from the switched communication, convert the dedicated communication into first packets including the first identifier in response to the first instruction, convert the switched communication into second packets including the second identifier in response to the second instruction, and transfer the first packets and the second packets.

25. The product of claim 25 wherein the dedicated processing system software is operational to generate and transfer a first call release message;

the call processing system software is operational to receive and process the first call release message to generate and transfer a third instruction indicating the first identifier for release, and receive and process a second release message to generate and transfer a fourth instruction indicating the second identifier for release; and

the interworking system software is operational to receive the third instruction and the fourth instruction, stop the transfer of the first packets in response to the third message, and stop the transfer of the fourth packets in response to the fourth instruction.

26. The product of claim 25 wherein a first time difference between the first call setup message and the first call release message is greater than twenty four hours and a second first time difference between the second call setup message and the second call release message is less than three hours.

27. The product of claim 24 further comprising:

graphical user interface software operational when executed on the processor to direct a graphical user interface to generate and transfer the first call setup message in response to a first user command entered into the graphical user interface and generate and transfer the second call release message in response to a second user command entered into the graphical user interface.

28. The product of claim 27 wherein the graphical user interface software is operational to direct the graphical user interface to receive the first user command and the second user command from a remote location.

29. The product of claim 24 wherein the first call setup message is an initial address message and the second call setup message is an initial address message.

30. The product of claim 24 wherein the dedicated communication is a data communication.

31. The product of claim 24 wherein the dedicated communication is a private line communication.

32. The product of claim 24 wherein the dedicated communication is an internet protocol communication.

33. The product of claim 24 wherein the dedicated communication is a frame relay communication.

34. The product of claim 24 wherein the switched communication is a voice communication.

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Docket #1322

ABSTRACT

The communication system comprising a dedicated processing system, a call processing system, and an interworking system. The dedicated processing system is configured to generate and transfer a first call setup message. The call processing system is configured to receive and process the first call setup message to select a first identifier, generate and transfer a first instruction indicating the first identifier and a dedicated communication, receive and process a second call setup message to select a second identifier, and generate and transfer a second instruction indicating the second identifier and a switched communication. The interworking system is configured to receive the first instruction, the second instruction, and a bundled communication including the dedicated communication and the switched communication. In response to the first instruction, the interworking system separates the dedicated communication from the switched communication and converts the dedicated communication into first packets including the first identifier. In response to the second instruction, the interworking system converts the switched communication into second packets including the second identifier and transfers the first packets and the second packets.

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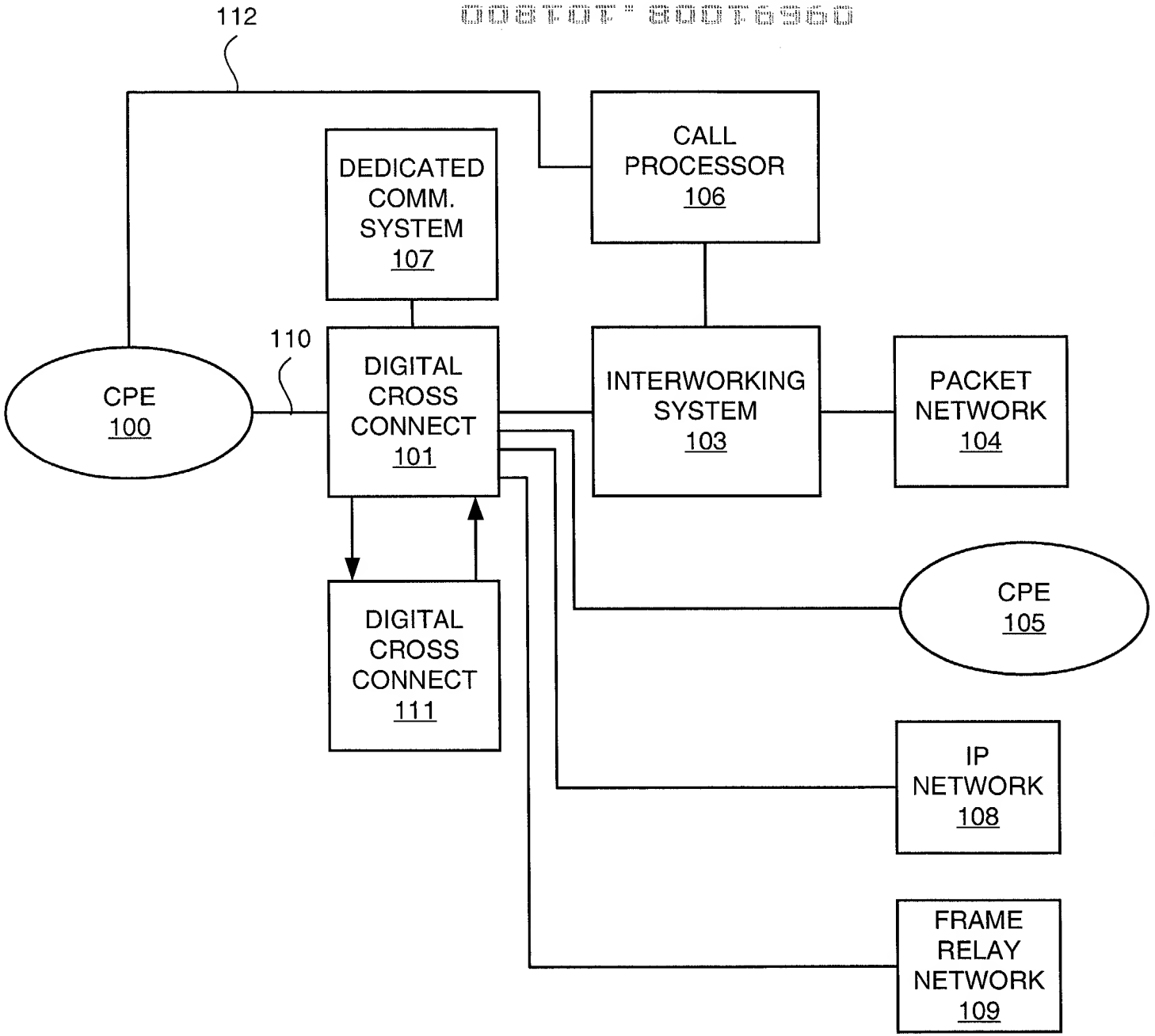

FIG. 1
PRIOR ART

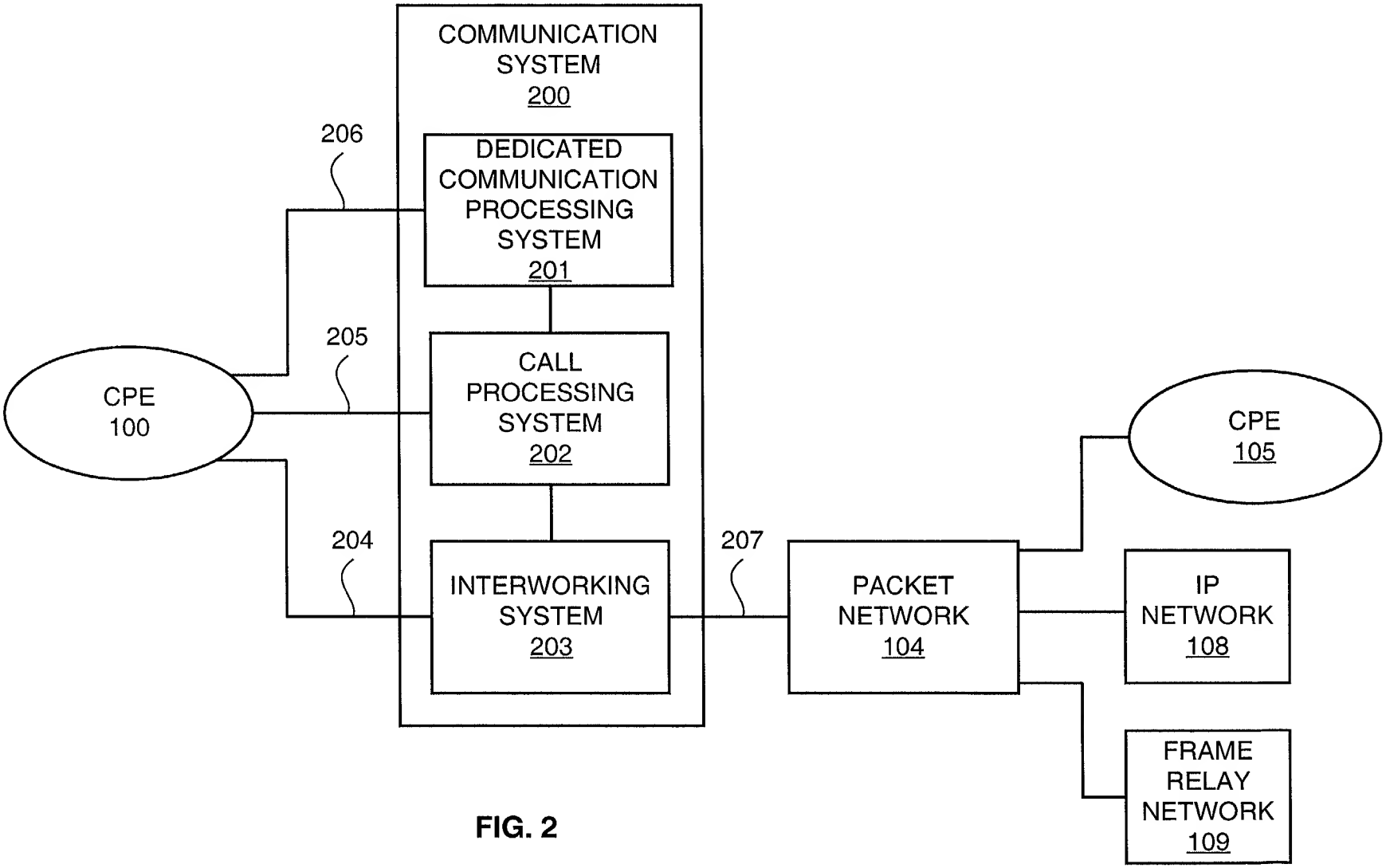
COMMUNICATION SYSTEM 200
206
DEDICATED COMMUNICATION PROCESSING SYSTEM 201
205
CALL PROCESSING SYSTEM 202
CPE 100
204
INTERWORKING SYSTEM 203
207
PACKET NETWORK 104
CPE 105
IP NETWORK 108
FRAME RELAY NETWORK 109

FIG. 2

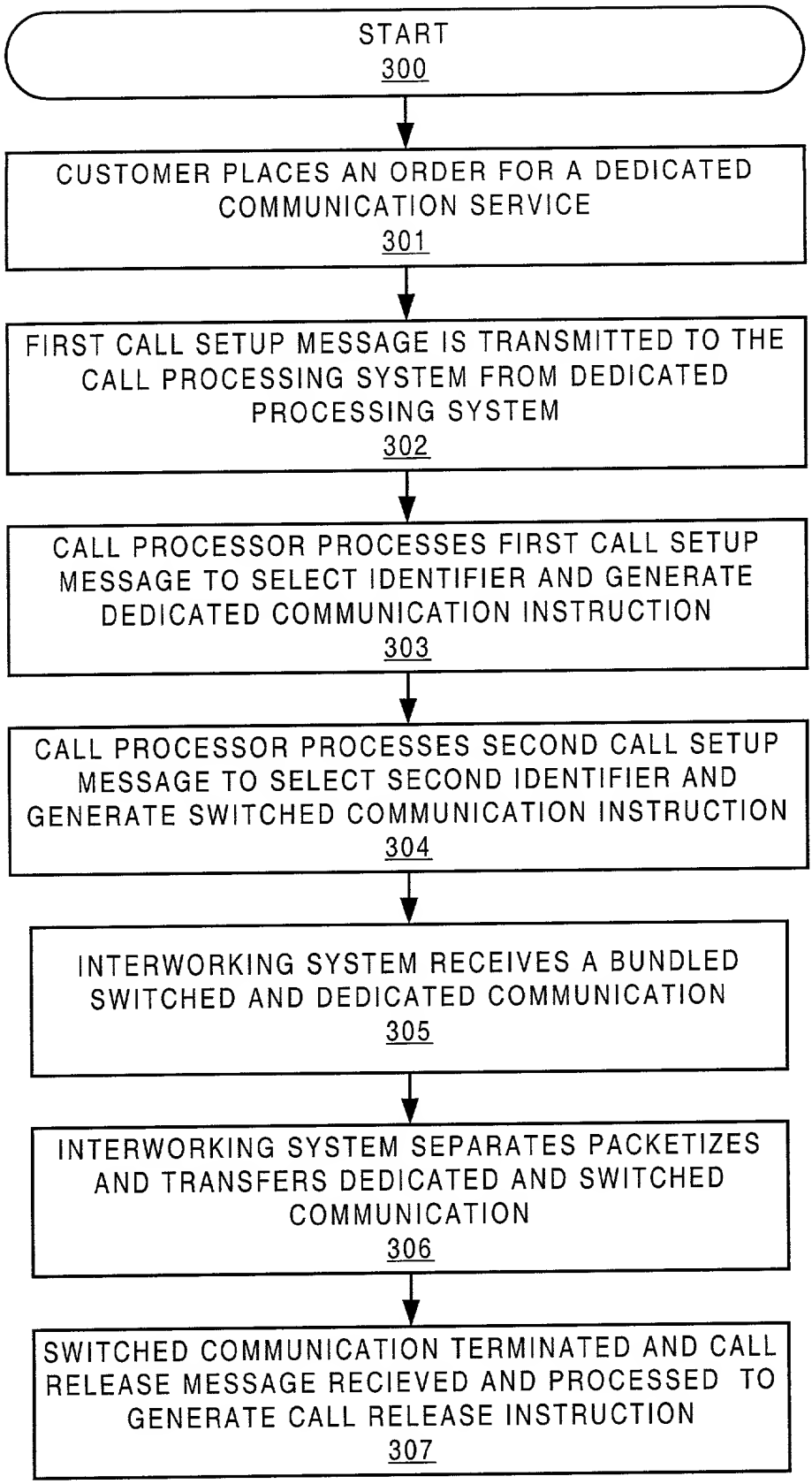
START
300
CUSTOMER PLACES AN ORDER FOR A DEDICATED COMMUNICATION SERVICE
301
FIRST CALL SETUP MESSAGE IS TRANSMITTED TO THE CALL PROCESSING SYSTEM FROM DEDICATED PROCESSING SYSTEM
302
CALL PROCESSOR PROCESSES FIRST CALL SETUP MESSAGE TO SELECT IDENTIFIER AND GENERATE DEDICATED COMMUNICATION INSTRUCTION
303
CALL PROCESSOR PROCESSES SECOND CALL SETUP MESSAGE TO SELECT SECOND IDENTIFIER AND GENERATE SWITCHED COMMUNICATION INSTRUCTION
304
INTERWORKING SYSTEM RECEIVES A BUNDLED SWITCHED AND DEDICATED COMMUNICATION
305
INTERWORKING SYSTEM SEPARATES PACKETIZES AND TRANSFERS DEDICATED AND SWITCHED COMMUNICATION
306
SWITCHED COMMUNICATION TERMINATED AND CALL RELEASE MESSAGE RECIEVED AND PROCESSED TO GENERATE CALL RELEASE INSTRUCTION
307

FIG. 3

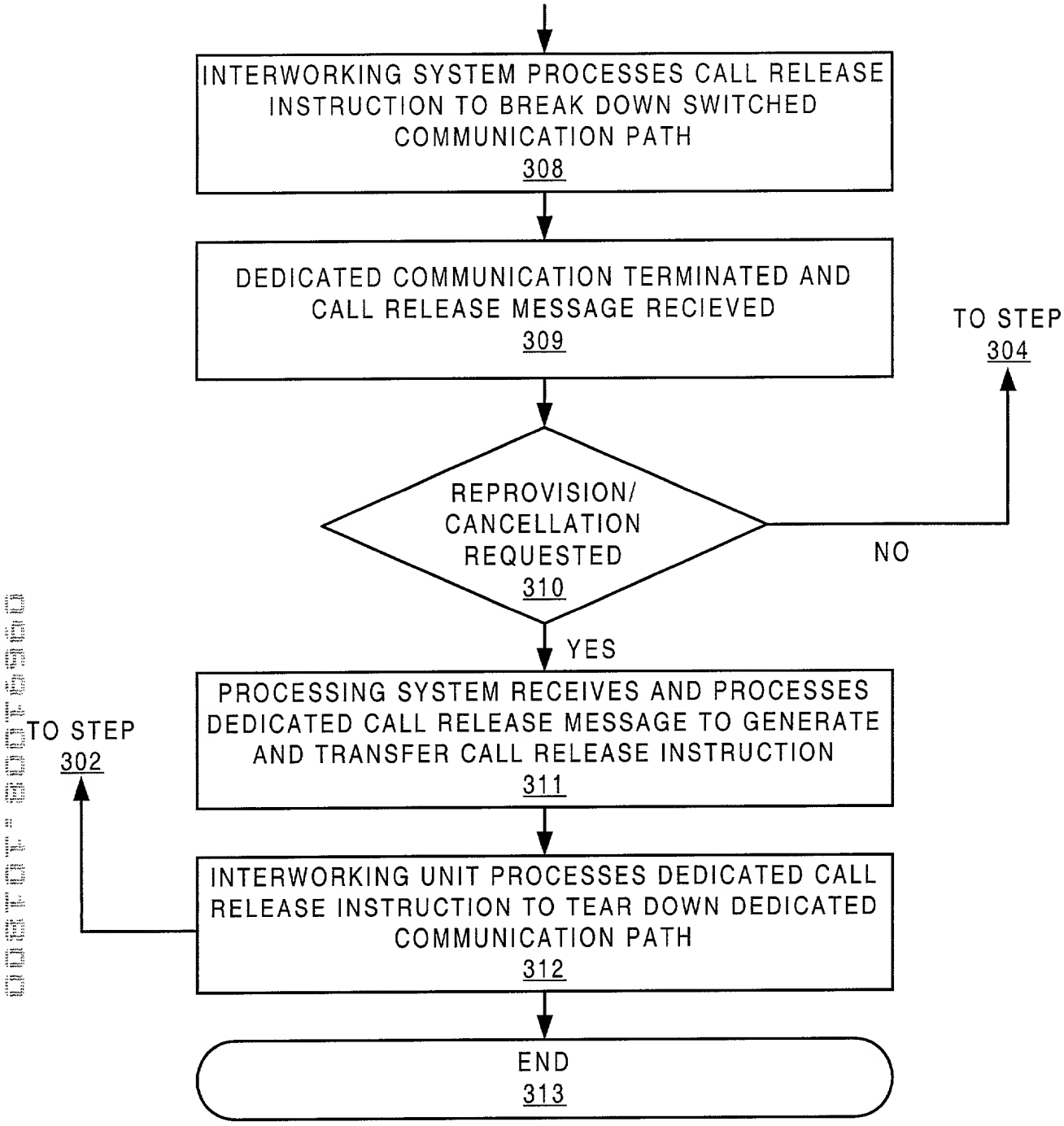
INTERWORKING SYSTEM PROCESSES CALL RELEASE INSTRUCTION TO BREAK DOWN SWITCHED COMMUNICATION PATH
308
DEDICATED COMMUNICATION TERMINATED AND CALL RELEASE MESSAGE RECIEVED
309
REPROVISION/ CANCELLATION REQUESTED
310
TO STEP
304
NO
YES
PROCESSING SYSTEM RECEIVES AND PROCESSES DEDICATED CALL RELEASE MESSAGE TO GENERATE AND TRANSFER CALL RELEASE INSTRUCTION
311
TO STEP
302
INTERWORKING UNIT PROCESSES DEDICATED CALL RELEASE INSTRUCTION TO TEAR DOWN DEDICATED COMMUNICATION PATH
312
END
313

FIG. 4

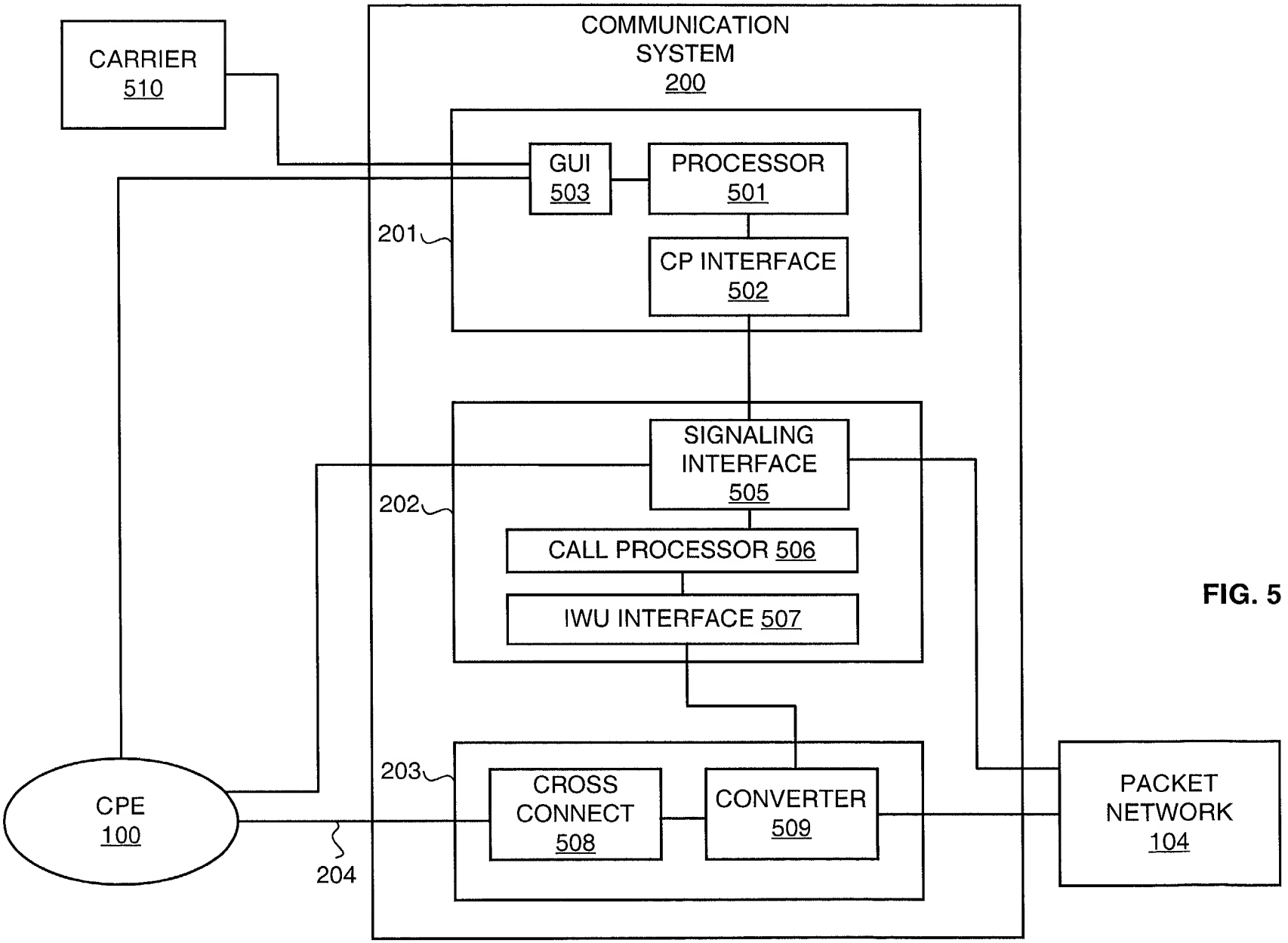
CARRIER
510
COMMUNICATION
SYSTEM
200
GUI
503
PROCESSOR
501
201
CP INTERFACE
502
SIGNALING
INTERFACE
505
202
CALL PROCESSOR 506
IWU INTERFACE 507
203
CROSS
CONNECT
508
CONVERTER
509
CPE
100
204
PACKET
NETWORK
104

FIG. 5

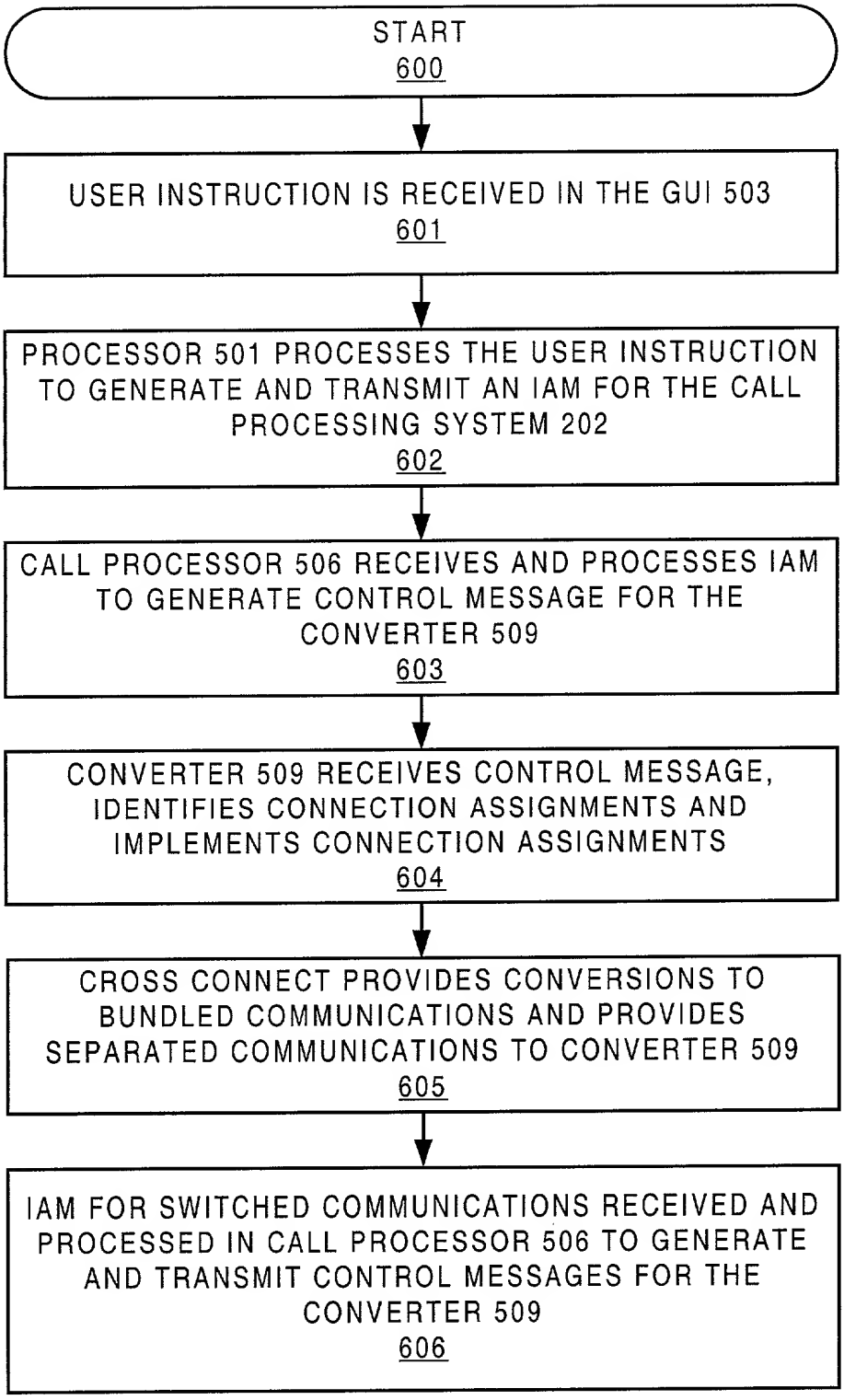
START
600
USER INSTRUCTION IS RECEIVED IN THE GUI 503
601
PROCESSOR 501 PROCESSES THE USER INSTRUCTION TO GENERATE AND TRANSMIT AN IAM FOR THE CALL PROCESSING SYSTEM 202
602
CALL PROCESSOR 506 RECEIVES AND PROCESSES IAM TO GENERATE CONTROL MESSAGE FOR THE CONVERTER 509
603
CONVERTER 509 RECEIVES CONTROL MESSAGE, IDENTIFIES CONNECTION ASSIGNMENTS AND IMPLEMENTS CONNECTION ASSIGNMENTS
604
CROSS CONNECT PROVIDES CONVERSIONS TO BUNDLED COMMUNICATIONS AND PROVIDES SEPARATED COMMUNICATIONS TO CONVERTER 509
605
IAM FOR SWITCHED COMMUNICATIONS RECEIVED AND PROCESSED IN CALL PROCESSOR 506 TO GENERATE AND TRANSMIT CONTROL MESSAGES FOR THE CONVERTER 509
606

FIG. 6

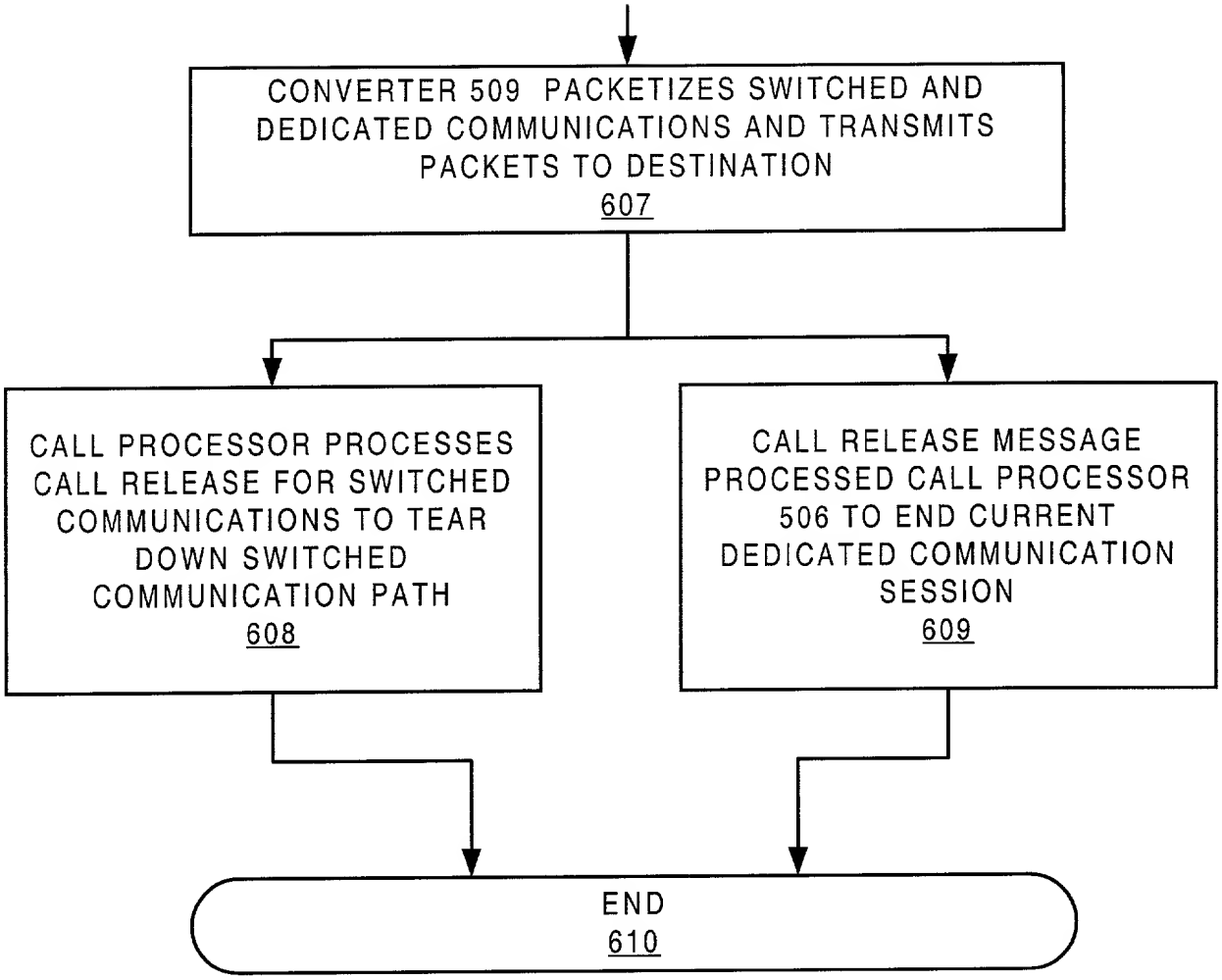
CONVERTER 509 PACKETIZES SWITCHED AND DEDICATED COMMUNICATIONS AND TRANSMITS PACKETS TO DESTINATION
607
CALL PROCESSOR PROCESSES CALL RELEASE FOR SWITCHED COMMUNICATIONS TO TEAR DOWN SWITCHED COMMUNICATION PATH
608
CALL RELEASE MESSAGE PROCESSED CALL PROCESSOR 506 TO END CURRENT DEDICATED COMMUNICATION SESSION
609
END
610

FIG. 7

DECLARATION AND POWERS OF ATTORNEY

As a below named inventor, I hereby declare that my residence and citizenship are as stated below next to my name. I believe I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled "COMMUNICATION SYSTEM FOR DEDICATED AND SWITCHED COMMUNICATIONS" the specification of which is filed herewith, if not identified here by filing date and application number, and is attached hereto. I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to the examination of this application in accordance with 37 CFR 1.56(a). I hereby claim foreign priority benefits under 35 USC 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate by me or my representatives or assigns for this invention having a filing date before that of the application on which priority is claimed:

Application No. _____ in _____ on _____ priority claimed ( ) Yes ( ) No
Application No. _____ in _____ on _____ priority claimed ( ) Yes ( ) No
Application No. _____ in _____ on _____ priority claimed ( ) Yes ( ) No

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

(Application Number)	(Filing Date)	(Status-patented, pending, abandoned)
(Application Number)	(Filing Date)	(Status-patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 USC 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon. I hereby appoint, individually and collectively, the following as my/our attorney or agent with full power of substitution and revocation, to prosecute this application and to transact all business in the U.S. Patent and Trademark Office connected therewith:

Harley R. Ball	Registration No. 31,733;
Steven J. Funk	Registration No. 35,875;
Michael J. Setter	Registration No. 37,936;
Carl A. Forest;	Registration No. 28,494;
James M. Graziano	Registration No. 28,300;
Thomas Swenson	Registration No. 36,696;
William P. Wilbar	Registration No. 43,265;
Travis C. Stephenson	Registration No. 45,132;
Eugene G. Kim	Registration No. 46,267; and
Brett Bornsen	Registration No. 46,566

PLEASE ADDRESS ALL COMMUNICATIONS TO:

CUSTOMER NUMBER: 021396
Attn: Harley R. Ball
Sprint Law Department
8140 Ward Parkway
Mailstop: MOKCMP0506
Kansas City, Missouri 64114

ATTORNEY CONTACT:

Michael J. Setter
Phone: (303) 449-9497
Fax: (303) 449-0814

SOLE OR JOINT INVENTOR

Inventor (1)
Claton F. Clevenger

Claton F. Clevenger
(Signature in Full)

Citizenship: USA
Post Office Address: Kansas City, MO 64149

Date: 10/11/00

Residence: 9415 East 147th Street
Kansas City, MO 64149

DOCKET: 5050.1050